BOOK REVIEWS

FUNDAMENTALS OF MECHANICS—by Rais Ahmed, pp-235. price Rs. 15/- Asia Publishing House.

The small book on mechanics meant for Higher Secondary or Pre-University classes of the Indian Universities is written in usual American style, but thoroughly Indianized for the better understanding of Indian students. The English is indeed very simple, and conversational justifying the authors claims. But the introduction to units is too verbose considering the size of the book scarcely any justice has been done to fundamental instruments of measurement. The point on the accuracies of the instruments, which beginners quite often miss, has not been well made. The picture of sliding vernier calipers has been simply titled "The vernier", the micrometer screwgauge as simply "The micrometer" Thus many of the picture titles are insufficient and inaccurate and likely to be confusing *e.g.* fig. 3.1 "Approximate motion of a table" in the class room". That is meant perhaps is the motion relative to a fixed coordinate system in space. Fig. 3.2 "Motion of rigid body. All particles move the same distance with the same velocity". Obviously, again, a translational motion is meant. Such imperfect ideas as the titles indicate, inculcated in the tender minds may be dangerous for the future, mental get up as a physicist. Moreover, the "conversational approach" of the author has allowed a number of serious inexactness in definition and loose talk creep in on pp. 16, 17, 22, *e.g.* definitions of motion, speed velocity etc., "direction of angular speed" etc. On wonders on reading the statement (page 139): "raw material + energy = finished product", whether raw material—energy will be = unfinished product'.

The book bristles with such queer statements and one cannot recommend the book to the students.

A. Bose

CRYOPHYSICS –by K. Mendelssohn. Pp. 183 price cloth : $ 4.50, paper $ 2.50 Interscience Publishers Inc.

The author a veteran in the field of cryophysics is essentially a physicist and his aim in this small book is to raise before the readers a clear physical picture of the outstanding phenomena occurring at Low temperatures which have shock the foundations of Solid State Physics, laid down these very foundations. Time and again we come across in his writing, a new angle of observation, and a simple way of putting a complex phenomenon before the reader and what can be more apt than the very opening lines of the Introduction pointing to the crux of cryophysics.

The small section on cryogenice is nevertheless a compendium of all major and most modern cryogenic deirces and informations. One may not, however, agree with the statement that J-T method is generally used for liquefaction of H_2 because of the fear of explosion hazard; since all the hazard is already present in compressing H and otherwise handling it, whichever method is adopted. A mention of spin lattice relaxation phenomenon would have been appropriate in connection with the magnetic cooling method.

In the chapter on thermometry, the paragraph on direct calibration of T^* against, would be better placed later, *i.e.* after a more basic method of comparing the magnetic scale to the thermodynamic scale has been discussed.

On page 52, it may suit for some purposes to speak that "In many cases especially in magnetically dilute salts Curie's Lae has been found valid over a wide temperature range". But one actually finds that Curie's Law is an ideal case more observed in its breach than validity.

Apart from exchange interaction such deviations may arise from ligand field splittings of the ground level and is often present.

It is indeed at the extreme low temperature, where saturation effect is prominent that the deviation from Curie Law is also prominent, thus complicating the issue.

However, since the sp. heat anomalies corresponding to ligand field effects are usually of the Schottky type and the book is too small for niceties the author is justified in making certain approximations in his statements.

It is often sufficient to discuss the thermal variation of properties of the limiting cases of a theory *e.g.* the magnetic susceptibility, sp. heat, thermal conditivity etc. This may however sometimes prove to limited particularly when the interaction are often dependent on temperature and on impurities or lattice defects. What happens in the intervening regions is then much more interesting than the limiting ranges.

The chapters on superconductivity and Helium Problem contain a wealth of information on these two baffling problems in cryophysics. This small book has no doubt made a very usefully place for itself in all Physics Libraries.

A. Bose

HANDBOOK OF VACUUM PHYSICS Edited by A. H. Beck. Vol. 1. Gasses and Vacua; parts 1-3—Pp. 208, price 40s net. Pergammon Press.

This is not a hand book in the German sense, but is a handy book of reference for vaccum technicians. It does not deal with the fundamental theories or descriptions of vacuum processes and gives only the barest mention of some of these and is therefore not meant for a beginner or even a half backed research worker referring to vacuum technology as a side line. On the other hand it discusses in quite details working formulae for vacuum pumps and allied set ups, and gives a wealth of technical data for different commercially available pumps and vacuum materials.

The working formulae for vacuum pumps and vacuum systems including systematic leak detection programmes will be of considerable help to vacuum technologists, but for research laboratories facing daily problems in maitaining high vacua on moderate scale. I would still prefer some book giving lots of practical hints in vacuum practice, and including good details of a number of modernised vacuum pumps circuits, gadgets, leak detectors etc.

The book contains three longish articles by specialists on (1) Vacuum technology as applied to continuously pumped system (2) Properties of high vacuum pumps and design of vacuum pumping systems and (3) Leak detection and detectors.

The section on ion-pumps, gelter pumps sorption-pumps and cryo-pumps is interesting, but again exasperatingly lacks in details. Several technical terms used in the book with hardly any explanation of the meaning. The author evidently assumes that all the readers have the necessary technological knowledge.

TABLE OF SINES AND COSINES TO TEN DECIMAL PLACES AT THOUSANDTHS OF A DEGREE—By H. E. Salzer and N. Levini, Pergamon Press, 1962, Price $ 10.

This good sized volume may be considered as a standard table of references for sines and cosines and represents the results of an enormous amount of patient, laborious and accurate computation. Those of us, who are accustomed to using trigonometrical tables upto four or five significant figures at no more than 1 minute interval will hardly want to touch this volume with a pair of tongs. But to a large number of computationists in the field of

space technology not too speak of astronomy, geodesy etc. the book will prove to be invaluable, since it strikes a golden mean and fills up a gap in the existing standard tables which either go to too many decimal places without the necessary accuracy in interpolation or go to too few decimal places with too great fractional interpolation. Through other trigonometrical rations could not be included in the book this is obviously not a fundamental need. Together with the explicit instructions for interpolations, direct and inverse, illustrated by examples, the book is sure to be of the utmost use to mathematicians, physicists and technicians alike in the field intended.

A. Bose

THEORY OF ELASTICITY—By M. Filonenko - Borodich p.p. 387 Price $ 6/- Translated from Russian by M. Kohayeva. Foreign Languages Publishing House, Moscow.

Theory of elasticity has developed on a more or less purely mathematical basis from the time of its inception in 17th century and has become one of the most important of classical physico-mathematical formalising. Importance of elasticity in technological problems no doubt tended to develop it as a means of routine investigation of the elastic properties of constructional materials. But the attempts to correlate between bulk elasticity and molecular binding forces have been rather inconspicuous. The recognition of anisotropy in crystalline materials though further complicating the problem of elastic bodies, has done much to improve the liaison between theories of macroscopic and microscopic elastic forces in the solid state. However, the microscopic theory of elasticity, closely linked to the theory of thermal vibrations in solids, is the matter of discussion of a different nature and is not contemplated in the present book. The contents of the present book deals entirely with the classical theory of elasticity of solids, but deals with it in a very able and concise manner, explaining with sufficient working examples, each of the different methods and theorems employed in the sequence of development of the subject. It is of a necessity not as analytical or elaborate as Love's classical book, but takes many short cuts in the formalisms and assuming a sufficient knowledge of vectors and tensors in the reader. As such the book may be somewhat difficult for the honours class students to take in their first reading. Once over the initial hurdles of introduction into the subject *i.e.* for more advanced readers the book should prove to be very useful.

A. Bose